

# Developing institutional knowledge of biodiversity

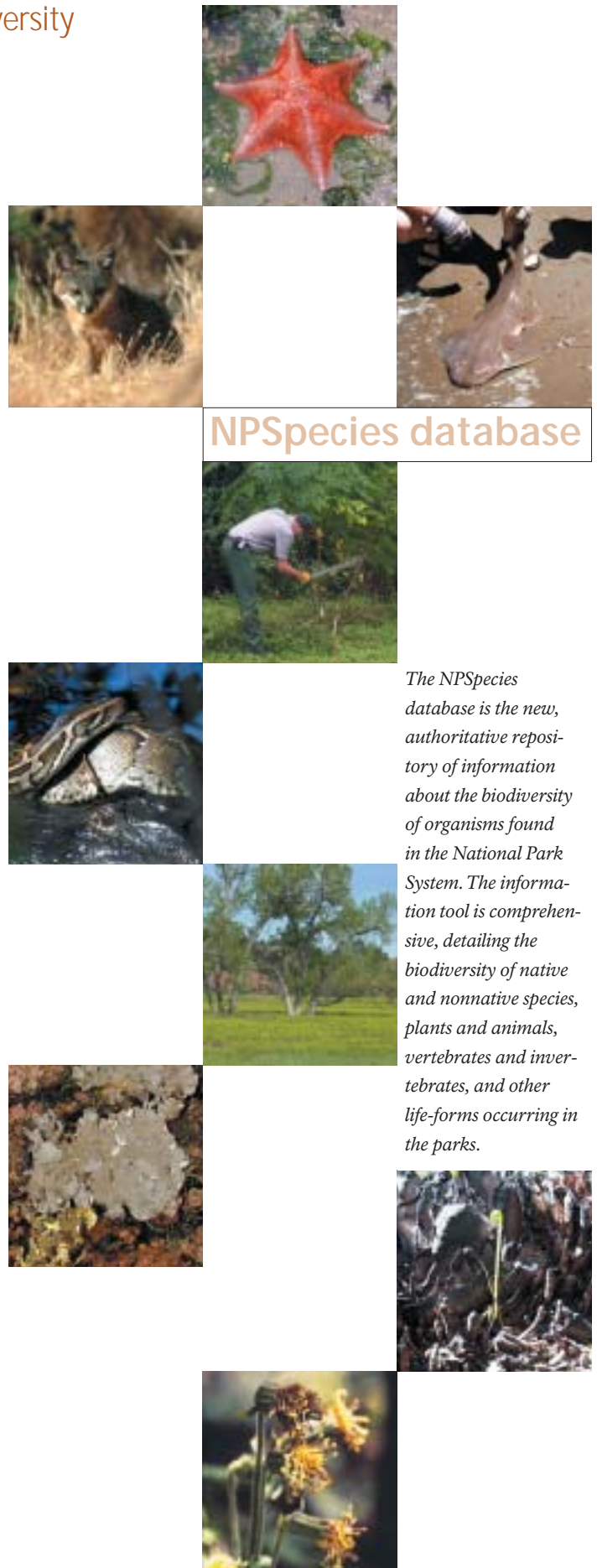
By Mark A. Wotawa

PRESERVING AND PROTECTING our natural heritage require “institutional knowledge” that is readily accessible. Until recently, detailed knowledge of park resources usually resided solely with park researchers and other park staff. The information was lost, having not been integrated into a sustainable format, as key staff members moved on in their careers. NPSpecies—the NPS database for biodiversity, which contains species lists and associated scientific evidence and serves as the core of a larger, integrated information system—changes this situation with respect to biodiversity. NPSpecies will help build institutional knowledge by housing biodiversity information indefinitely for parks, scientists, and the public. NPSpecies also makes the information available for applications beyond immediate park management purposes.

Institutional knowledge in this context results from the collection, organization, and verification of raw field data and their subsequent integration, analysis, and dissemination to produce usable scientific knowledge. Developing institutional knowledge of biodiversity in the National Park System is especially challenging because of the ecologically and physically diverse environments of the national parks, the dynamic nature of biodiversity in a world of changing landscapes, and constant change in taxonomic systems. Also, the many disparate programs and projects that contribute to the information base of biodiversity demand extensive human resources and fiscal support. A system like NPSpecies, which incorporates the information-sharing capabilities of the Internet, helps develop and preserve institutional knowledge of biodiversity efficiently and effectively.

The development of NPSpecies began in 1999 with the conversion of existing data, and later the entry of new data acquired primarily from field surveys of vertebrate animals and vascular plants through the Inventory and Monitoring Program. In 2003, with enhancements to NPSpecies for quality assurance, NPS staff began to conduct formal review and verification of each newly completed field survey. Biologists and taxonomists from numerous NPS partners participated in efforts to collect, organize, review, and verify NPSpecies data, including those from other federal and state agencies (e.g., the U.S. Geological Survey), universities, Cooperative Ecosystem Studies Units, and nongovernmental organizations such as NatureServe and natural heritage programs.

NPSpecies examples include (from top to bottom, left to right) marine and terrestrial animals such as batstar (*Patiria miniata* at Point Reyes National Seashore, California), island fox (*Urocyon littoralis santacruzae* at Channel Islands National Park, California), angel shark (*Squatina californica* at Point Reyes); nonnative plants and animals such as invasive chinaberry (*Melia azedarach* at San Antonio Missions National Historical Park, Texas), python (*Python* sp. at Everglades National Park, Florida), and leafy spurge (*Euphorbia esula* L. at Devils Tower National Monument, Wyoming); and a new species of lichen (*Leioderma* sp.) discovered as part of the All Taxa Biodiversity Inventory at Great Smoky Mountains National Park, Tennessee and North Carolina, a newly discovered fern (*Schizea pennula* at Big Cypress National Preserve, Florida), and endemic *Rugelia nudicaulis*, which occurs only in Great Smoky Mountains in high-elevation areas.



The NPSpecies database is the new, authoritative repository of information about the biodiversity of organisms found in the National Park System. The information tool is comprehensive, detailing the biodiversity of native and nonnative species, plants and animals, vertebrates and invertebrates, and other life-forms occurring in the parks.

Major advances to integrate NPSpecies information, both within and outside the National Park Service, occurred in 2003. In addition to previous integration with the natural resource bibliography (NatureBib), NPSpecies was combined to varying degrees with other NPS information systems. These include the Exotic Plant Management Team's Alien Plant Control and Monitoring (APCAM) database, the Fire-Effects Program Fire Ecology Assessment Tool (FEAT) database, the Natural Resource Management Assessment Program (NRMAMP) database, the natural resource metadata database with its associated GIS map and data archive (NR/GIS Metadata), the Incident Management Analysis and Reporting System (IMARS), and the Automated National Catalog System (ANCS+) of the NPS Museum Management Program.

Outside the National Park Service, the National Wildlife Federation directly integrates verified species lists from NPSpecies and interpretive information in their eNature database to produce park-specific interpretive field guides that will be available over the Internet. Through an online, interactive tool, park staff will be able to tailor the generic multimedia information, including pictures, sounds, maps, and text. In a related cooperative venture with the ALL Species Foundation and Discover Life in America, the interpretive field guides will showcase species previously unknown to science that were discovered in parks, and other significant finds, such as range extensions and new populations. Having this knowledge available in a central location on the Internet (anticipated early 2004) will provide interpreters and educators with a tool to greatly enhance the experience of park visitors.

The U.S. Fish and Wildlife Service has recognized the potential for NPSpecies to document the biodiversity of the National Wildlife Refuge

System. In 2003, NPS staff began discussing how the two agencies could use NPSpecies for information exchange. A partnership arrangement that uses NPSpecies would save human and fiscal resources and provide a common tool for scientists and managers to collaborate on solutions to similar natural resource issues in both parks and refuges.

The final, all-important step in developing institutional knowledge is making the information widely available to all NPS constituents for scrutiny. Development has begun on the public, online version of NPSpecies, with the anticipated sharing of appropriate and verified information starting in 2004. Tools to produce comparative summary statistics for analysis currently are available in NPSpecies, and geospatial tools to integrate products from other inventories, such as vegetation maps, are in development. Making the same information available to scientists and natural resource professionals throughout the world will result in ongoing analyses of information that contributes to the management and protection of natural resources in parks.

The National Park Service continues to support other programs that assist in documenting biodiversity, including the All Taxa Biodiversity Inventory. An oceans program that would help record the biodiversity of marine organisms for 70 coastal parks is on the horizon. NPSpecies has the capability to integrate, analyze, and disseminate information from all of these programs and to ultimately fulfill the vision of accurately and systematically developing institutional knowledge of biodiversity in the National Park System. ■

---

[mark\\_wotawa@nps.gov](mailto:mark_wotawa@nps.gov)

Ecologist-Biological Inventory Coordinator, Natural Resource Information Division; Fort Collins, Colorado

## award-winner

### Brian Carey honored for successfully integrating natural resource management in a "cultural" park



Brian Carey, chief of Resource Management and Visitor Protection at Lyndon B. Johnson National Historical Park (Texas), is the winner of the 2002 Trish Patterson-SCA Award

for Natural Resource Management in a Small Park, awarded in 2003. This park was established to preserve cultural resources, including the Texas White House during its namesake's presidency. Before coming to this park in 1995, Brian worked at three other national parks, but this is his first "cultural" park. Brian's natural resource management activities, such as treating the 55-acre (22-ha) pecan grove using integrated pest management and partnering to remove invasive species from the prairie plots, reflect his belief that preserving and interpreting

cultural resources also require understanding and stewardship of the natural landscape in which they occur.

Balancing the preservation of cultural resources with natural resources can be tricky. For example, at Lyndon Johnson a historic cattle herd has traditionally been pastured and watered along the banks of the Pedernales River, posing two natural resource-related problems: cattle trails along the river are eroding the banks, and movement of the river channel is changing the historical boundaries of the pasture. Which is the most important resource to preserve in this cultural landscape? In this case, under Brian's leadership, the banks of the Pedernales River are being protected with electric fencing; the cattle are being watered at troughs; and native, stabilizing, riparian vegetation is thriving. Whether to restrict the meandering river or to dampen the effects of three old dams in this reach of the

Pedernales River is still being decided.

Beyond his park, Brian has played an important role as co-coordinator of the Southern Plains Vital Signs Monitoring Network. The 11 parks in this network are primarily cultural and recreational units with limited natural resource budgets and staff. Brian has taken the lead in attracting partners and implementing agreements in order to survey the parks and update staff who are unfamiliar with inventory techniques.

Although Brian was a biology major in college, he considers himself a generalist. He says, "I enjoy getting involved with all aspects of the parks. What is especially interesting here is that Lyndon Johnson was so attached to this land rooted in the Texas hill country. You can see that reflected in the natural resources legislation he promoted throughout his career." ■